



# Magnesium Elektron

SERVICE & INNOVATION IN MAGNESIUM

# Elektron MSR-B

Datasheet : 463

Magnesium Elektron UK,  
P.O. Box 23, Rake Lane, Swinton, Manchester, M27 8DD, England.  
Tel: 0161 911 1000 Fax: 0161 911 1010  
Web: [www.magnesium-elektron.com](http://www.magnesium-elektron.com) VAT No: GB 668 2142 26

A Division of MAGNESIUM ELEKTRON LIMITED. Registered in England No. 3141950.  
Registered Office: The Victoria, 150-182 Harbour City, Salford Quays, Salford, M50 3SP  
A Luxfer Group Company

# Elektron MSR-B

ELEKTRON MSR-B is a high strength magnesium casting alloy developed by Magnesium Elektron to have good ambient and elevated temperature properties whilst retaining good foundry characteristics.

It is a fully heat treatable magnesium alloy containing silver and rare earth metals. It is pressure tight, weldable and may be used up to temperatures of 200°C.

## APPLICATIONS

The alloys will be of interest to designers requiring good retention of properties at elevated temperatures for aerospace, automotive and military applications.

## SPECIFICATIONS

AECMA MG-C-51  
AFNOR G-Ag2.5TR  
MOD DTD 5035A  
UNS M18220

## CHEMICAL COMPOSITION

Silver	2.0-3.0%
Rare Earths	2.0-3.0%
Zirconium	0.4-1.0%
Magnesium	Balance

## HEAT TREATMENT

The alloy is used in the T6 heat treated condition ie.  
8 hours at 525°C  
hot water or polymer quench  
age for 16 hours at 200°C.

## PHYSICAL PROPERTIES

Specific gravity	1.82
Coefficient of thermal expansion	$26.7 \times 10^{-6} \text{K}^{-1}$
Thermal conductivity	$113 \text{Wm}^{-1} \text{K}^{-1}$
Specific heat	$1000 \text{Jkg}^{-1} \text{K}^{-1}$
Electrical resistivity	68 nΩm
Modulus of elasticity	44 GPa
Poissons ratio	0.3
Melting range	550-640°C
Damping Index	0.4
Vickers hardness	80-105

## DESIGN DATA

Minimum specification tensile properties	
0.2% Proof stress	185 MPa
Tensile strength	240 MPa
Elongation	2%

## OTHER PROPERTIES

### CASTABILITY

Fine grained and pressure tight with good casting characteristics.

### PATTERN MAKERS SHRINKAGE FACTOR

1.3%

### WELDABILITY

Weldable by the tungsten arc inert gas process (TIG) with a filler rod of a similar composition. Castings should be heat treated after welding.

### MACHINING

ELEKTRON MSR-B castings, like all magnesium alloy castings, machine faster than any other metal. Providing the geometry of the part allows, the limiting factor is the power and speed of the machine rather than the quality of the tool material. The power required per cubic centimetre of metal removed varies from 9 to 14 watts per minute depending on the operation.

### SURFACE TREATMENT

All the normal chromating, anodising and finishing treatments are applicable.

### CORROSION RESISTANCE

ASTM B117 Salt spray test	
Corrosion rate	5.6mg/cm <sup>2</sup> /day 430mpy

# Elektron MSR-B

## AMBIENT TEMPERATURE MECHANICAL PROPERTIES

### TYPICAL TENSILE PROPERTIES

0.2% Proof stress	205 MPa
Tensile strength	266 MPa
Elongation in 5.65√A	4%

### TYPICAL COMPRESSIVE PROPERTIES

0.2% Proof stress	165-200 MPa
Ultimate strength	310-385 MPa

### TYPICAL SHEAR PROPERTIES

Ultimate stress	152 MPa
-----------------	---------

### FRACTURE TOUGHNESS

K <sub>IC</sub>	14.9 MPa m <sup>1/2</sup>
-----------------	---------------------------

### FATIGUE PROPERTIES

#### Rotating bend fatigue test

Endurance Limit MPa	Stress Reversals 5 x10 <sup>7</sup>
Unnotched	100

## ELEVATED TEMPERATURE MECHANICAL PROPERTIES

### TYPICAL TENSILE PROPERTIES

	0.2% Proof stress (MPa)	Tensile strength (MPa)	Elongation (%)
100°C	195	230	15
150°C	182	208	19
200°C	165	185	24
250°C	122	160	30

### CREEP STRENGTH

#### Stress (MPa) to produce specific creep strains

	Hours	0.1%	0.2%	0.3%
150°C	10	-	-	-
	100	-	-	-
	500	-	135	160
	1000	-	123	151
200°C	10	102	-	-
	100	74	86	103
	500	54	65	83
	1000	46	56	72
250°C	10	43	-	-
	100	26	34	41
	500	14	22	27
	1000	10	16	21



Certificate No. FM12677